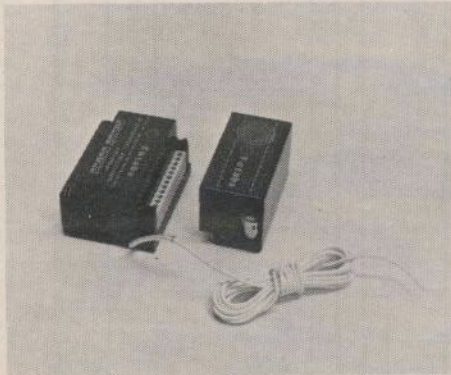
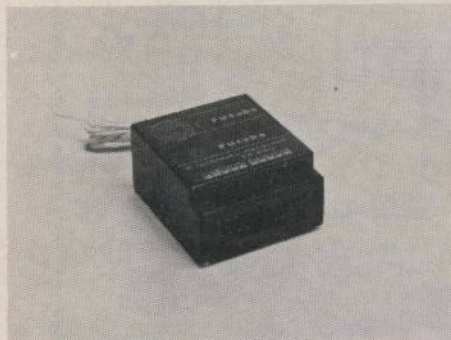


Futaba

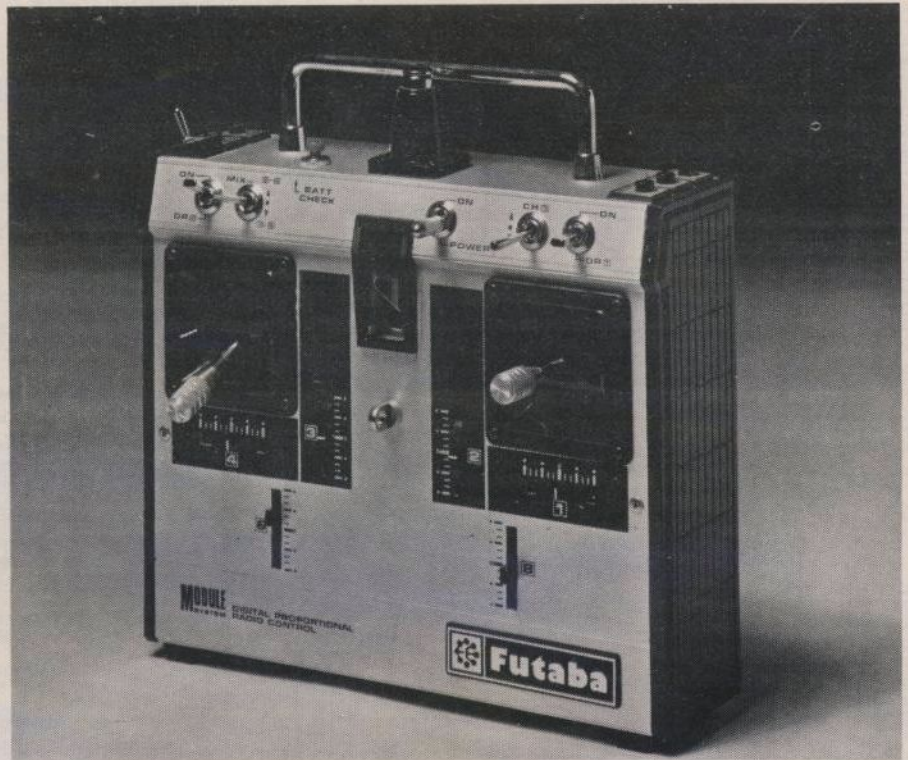
THE NEW SUPER RADIO THAT WILL DO EVERYTHING BUT SCRATCH YOUR BACK.



Receiver splits; frequency module, right.



Servo leads plug into end of receiver.



The transmitter is as nice to look at as it is to use. Lookit all them switches!

• My introduction to the Futaba FP-8JN was at the 1979 Toledo Show when I visited Mr. York Daimon, National Sales Manager, at the Futaba booth. I marveled at the set then and I marvel at it now in doing this "Bench" review. I think the first thing that strikes you is the number of front (and top) panel controls . . . would you believe 20?! However, as you use the system, this apparent complexity vanishes. The Mode II system I received had a very well thought out (human engineered) control layout, but you need both hands free, hence an adjustable neck band is provided which hooks to the front of the transmitter.

FEATURES: A desirable feature of the FP-8JN is its flexibility with respect

to frequency and modulation. The basic transmitter and receiver can accept any of the 27 MHz channels with AM modulation, any of the 53 MHz channels with AM or FM modulation, and any of the 72 MHz channels with AM. All transmitter modules are physically interchangeable, with the module being located in the back of the transmitter case, and they can be changed in a matter of seconds. Similarly, the receiver modules are interchangeable. Both modules must be replaced when making a frequency or modulation change.

Other unique features include servo operation from transmitter without radiating; servo normal/reverse switch for aileron, elevator, throttle and rudder; ad-

justable length sticks; adjustable servo limits; elevator and flap mixing, flap and spoiler mixing; two roll buttons with aileron deflection and direction adjustable; two snap roll buttons with aileron, elevator, and rudder deflection and direction adjustable; throttle button with high/low ends adjustable; and, lastly, a servo tray that holds four servos in place with only six screws.

HARDWARE: An FP-8JN system is delivered with transmitter and receiver frequency and modulation modules of your choice (presently only the 53 MHz band has FM—amateur "ham" license required), four FP-S121 servos, switch harness, servo extension cables, airborne nicad pack, charger, neck strap, Direct

FP-8JN

by Charles Kenney

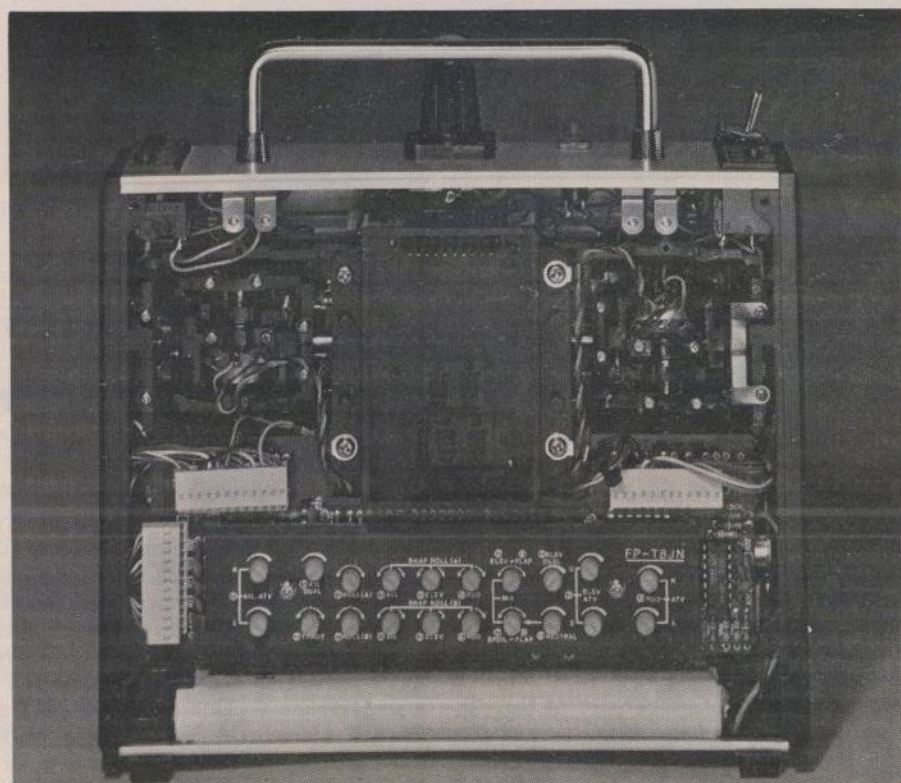
Servo Control (DSC) intermediate cord, landing gear adapter cable, frequency flag, and servo mounts. The system is normally delivered with four standard FP-S121 servos; however, a high speed servo (FP-S121H) and a landing gear servo (FP-S121G) are available.

FRONT PANEL CONTROLS: The Futaba FP-8JN has the following channel assignment: channel 1—aileron; channel 2—elevator; channel 3—throttle; channel 4—rudder; channel 5—landing gear; channel 6—flaps; channel 7—spoiler; channel 8—auxiliary.

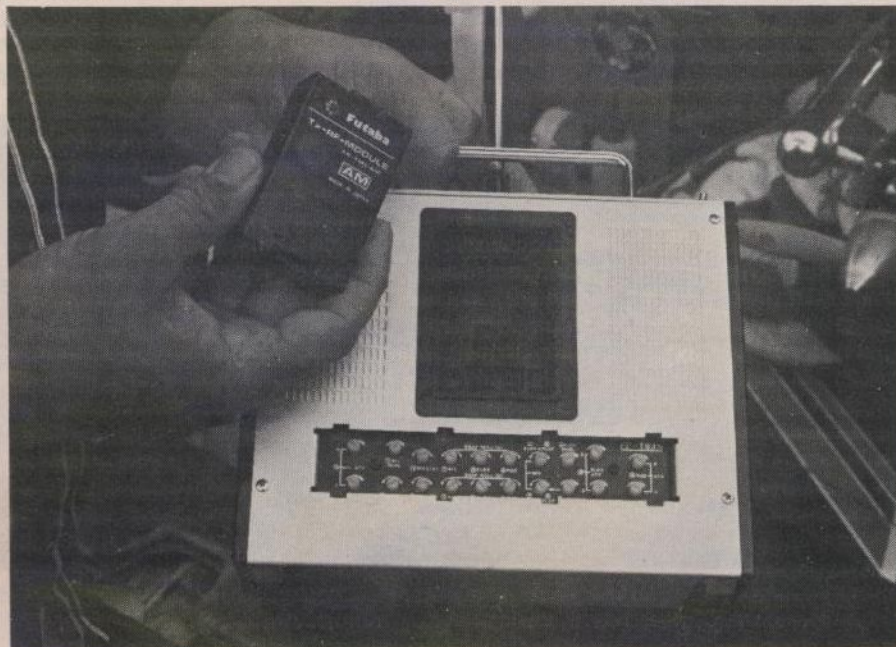
In addition to the conventional Mode II stick placement and associated trims, two of the trimmable channel controls are also located below the stick positions and are designated channels 6 and 8. Along the top front of the transmitter are five switches (right to left): aileron dual rate, spoiler/air brake mixer, power on/off, elevator/flap mixer, and elevator dual rate switch. It is interesting to note that the switches have different shapes. For example, the two dual rate switches on the far left and right both have flats on the top and bottom of the switch toggle. Similarly, the two mixing switches are round and slender and about twice as long as the dual rate switches. Thus, you can tell by feel which is "rate" and which is "mix," and you can learn to use your transmitter switches by feel, just as you do the sticks. The remaining switch, power on/off, is also unique. You must physically pull the toggle toward you to unlock it before flipping it up to the ON position, so there is no way you can inadvertently turn the transmitter on. Turning the transmitter off requires opposite action—toggle out and down.

Let me briefly describe how a dual rate channel and a mixing channel work. I won't describe how every feature works because the instruction manual does that most eloquently, but let's use a dual rate elevator control as an example. When the "Dual Rate" travel is set to ON, the deflection angle is small—within the

(Continued on page 98)



Back of Tx: Servo reversing switches are located behind RF module, trim adjustments are in panel below. Modules are available for all R/C frequencies, plus AM & FM.



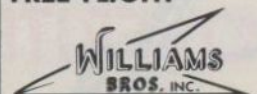


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ENGINE REVIEW

(Continued from page 96)

was usually instantaneous. Running qualities were also good. The engine ran steadily and without excessive vibration on all appropriate prop sizes.

Stripped down and examined at the end of the test program, the G.21/40 was found to be in excellent condition. Incidentally, to remove the piston and rod assembly and/or crankshaft, it is necessary to first withdraw the cylinder liner and remove the screw-in aluminum plug from the rear of the main casting. This will give access to the wristpin, which can then be extracted by means of a tapered stick of balsa pushed into the hole in the wristpin pad, enabling the piston and conrod to be removed separately.

All in all, the G.21/40 is still a good all-round sport engine. However, before making a decision, prospective purchasers might care to bear in mind that the G.21/46 has the same external dimensions and a similar weight, but a 15 percent larger displacement. Our earlier test model G.21/46 R/C delivered a gross output, on 5 percent nitro fuel, of 0.84 bhp at 14,000 rpm. This is some 27 percent more power than the present test model G.21/40 and, although average examples of the 40 and 46 may not show such a wide difference in performance, the 46 would appear to be a better choice for those requiring a bit more performance. (Incidentally, the official factory figures credit the current G.21/46 R/C with an output of 0.85 bhp, compared with a 0.72 bhp claim for the G.21/40 R/C—an increase of 18 percent.)

It is worth recording also that the earlier test model G.21/46 did not have the lengthy "sub-piston induction" period of

the present G.21/40 and, as a result, when fitted with a muffler, suffered a very much lower power loss than that recorded in our present test. The main reason why the 46 had a negligible sub-piston period was that its exhaust ports were shallower—4.5 mm deep instead of 5.0 mm. Also, since it had a larger diameter piston, the curved skirt cutaways necessary to clear the crankweb and backplate fore and aft (the same radius in both engines) did not extend so far around the bore, and therefore only just cleared the outer bottom corners of the two outer ports at TDC.

One final word here. We have not had the opportunity of examining the latest version of the G.21/46 so we do not know, precisely, how it may differ from our 1973 test engine. We can only say that the 1973 G.21/46 was a very good engine and hope that nothing has been changed that would reduce its performance. ■

F&B: FUTABA FP-8JN

(Continued from page 29)

range indicated by the hatched lines in Figure 1. The deflection can be varied from 40% to 100% of the total by adjusting the trimmer "Elevator-Dual" at the rear of the transmitter. To spin or use other large control deflections, set the switch to ON, and adjust control horns and trimmers for level flight; then when the switch is turned to OFF, kick-up is set and the deflection is large. Aileron dual rate operates in the same fashion.

To use a mixing control—elevator and flaps, for example—place the switch in the UP position, toward channels 2 and 6. To set up a landing configuration, for example, the elevator to flap deflections can be set by adjusting the "Elevator-

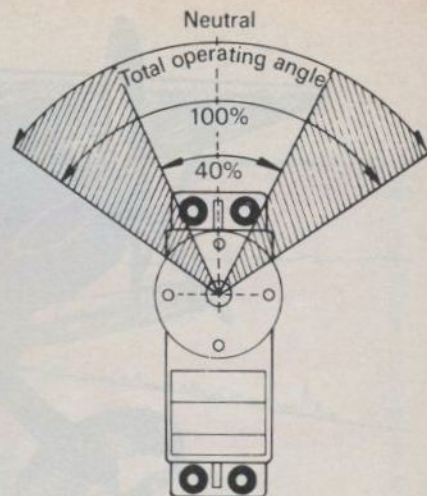


FIGURE 1.

Flap" mix trimmer on the back of the transmitter. Since the center of the mix trimmer is 0° differential, the mix direction can be changed.

The channel 6 front panel trimmer control can be used to set flap neutral position. To release the mixed control, return the switch to neutral. To mix flaps and spoilers, place the same mix switch to the DOWN position (channels 6 and 7) and adjust the appropriate rear panel pot for the desired mix. In addition, the channel 7 mix switch must be up. When the channel 7 mix switch is in the DOWN position, the flaps and spoilers are operated simultaneously. The operating manual cautions that the channel 7 (spoiler) switch *should always be released* before releasing the channel 2-6/channel 6-7 mix switch to neutral. If this procedure is reversed, the flaps will neutralize but the spoilers will remain open, placing the aircraft in a potentially dangerous state. Figure 2 shows the range of adjustment of the aileron, elevator, and rudder deflection angles.

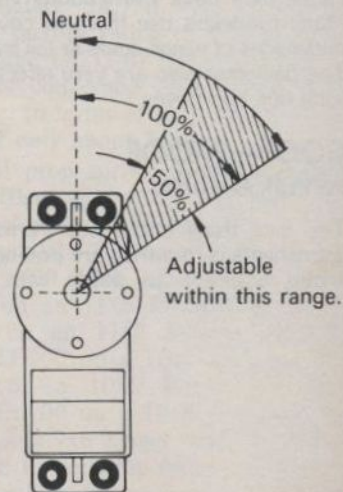


FIGURE 2.

Rounding out the front panel is a combination RF power meter/expanded scale voltmeter. When the transmitter is turned on and the antenna is extended, the RF

(Continued on page 100)

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F&B: FUTABA FP-8JN

(Continued from page 98)

power meter reads power output—maximum deflection for a fully charged transmitter is equivalent to approximately 500 milliwatts of radiated power. When the battery check switch is depressed, the indicator acts as an expanded scale voltmeter to read transmitter battery voltage—nominally 9.6 VDC for a fully charged transmitter battery.

TOP PANEL CONTROLS: There are seven controls on the top of the transmitter: on the left side, two snap roll buttons (A and B), a landing gear switch, and a battery check switch; on the right side, two roll buttons (A and B) and a throttle button. The landing gear switch is conventional—up and down. Roll buttons A and B can be set for slow roll, fast roll, A roll left, B roll right, etc., as you wish. Each control is adjusted at the back panel; when the roll button is pushed, the ailerons will move to, and stop at, the preset deflection angles. The throttle button allows a preset throttle position—say, idle—to be used during maneuvers at the appropriate time simply by depressing the button. The two snap roll buttons (A and B) can be used to snap right or left, or spin right or left, or whatever you want to set in. In adjusting the snap roll A and B, you may adjust aileron throw, elevator throw, and rudder throw as well as direction to obtain any

combination of these three surfaces. All trimmable controls are located on the back panel. The adjustable travel volume (ATV) is shown in Figure 2.

BACK PANEL CONTROLS: The back panel controls consist of switches and trimmers. To gain access to the switches, the RF module must be removed by depressing two spring-loaded tabs and pulling the module from the case. The switches are for servo Normal/Reverse and are identified by channel number: 1—Aileron, 2—Elevator, 3—Throttle, 4—Rudder, and 5—Adjustable Limit Throttle, which allows the throttle to be adjusted at high side or low side of the travel—normally used on low position. A total of 20 trimmers are located under an access panel, which must be removed by sliding in the direction of the "open" arrow. Each trimmer is numbered and identified by function. Two trimmers are used for Aileron Travel, right and left; one trimmer for Aileron Dual Rate; one trimmer for Throttle button; one trimmer for roll button A; one trimmer for roll button B; one Aileron trimmer for snap roll A; one Elevator Trimmer for snap roll A; and one rudder trimmer for snap roll A. Also, three more trimmers aileron, elevator, and rudder for snap roll B; one trimmer to mix elevator and flap; one trimmer to mix spoiler and flaps; one trimmer for elevator dual rate; one trimmer for flap neutral position when used with spoilers; one trimmer to adjust elevator travel—up; one trimmer for elevator travel—down; one trimmer for rudder travel—right; and, lastly, one trimmer for rudder travel—left.

The Futaba FP-8JN is a quality system. It is well made and employs state-of-the-art electronics and mechanics. Its utilization of frequency/modulation modules is a very attractive feature. In addition, the Direct Servo Control (without transmitting) is most desirable. Employing conventional nicad battery packs, approximately two hours of flying should be obtained from fully charged batteries. Needless to say, the system was designed for the serious competition flier and a flight review of the FP-8JN is conducted in the "Revenger" Field & Bench article in this issue. Futaba includes a very well illustrated, nine-page instruction manual, as well as a flight manual illustrating the proposed FAI F3A pattern. Competition fliers should look very carefully at the capabilities of this new Futaba system. It truly will do just about everything but scratch your back. ■

F&B: REVENGER

(Continued from page 31)

right-hand switch controls spoiler position. Trim pots control the amount of mixing desired and the flap neutral position. Futaba's instructions on this are a little unclear and a diagram of the type spoilers, flaps, and their desired positions in various operational modes would be

helpful.

With all of these buttons and switches, the use of a neck strap is recommended and one is thoughtfully provided with the set. I was concerned about the possibility of mistaking the on/off switch for the spoiler position switch during flight. Once again Futaba's engineers had done their homework, and a clever locking feature is included on the power switch. It must be grasped and pulled outwards before flipping up or down.

Another very worthwhile feature is a direct servo control cord that, when connected to the transmitter charging jack and an external jack on the airplane, allows complete operation of the system without turning on the transmitter—very convenient for making adjustments while someone else is flying on your frequency. (If the man at the transmitter impound is nervous about letting you have your transmitter, the RF module can be left with him!)

The system includes all the usual accessories such as servo trays, frequency flag, extra servo arms, charger and switch harness. One feature left off that I have become used to is an external charging jack. However, it should be no problem to add that in the future if desired. A Y-harness is included and the instruction book suggests the use of two retract servos. Steve Helms of Radio South assures me that one servo has more than ample power to operate all three gears as installed on his "Bootlegger." I chose to use the Y-harness and two individual servos on the test airplane simply because I dislike the mechanical linkage necessary when a single servo is used.

In addition to the standard instruction booklet, Futaba has included a flight manual diagramming each maneuver, with recommendations for the position of rate switches, flaps, and spoilers. Warranty period on the radio is 180 days. The only additional feature that might be considered desirable in the future is exponential control. An autopilot and on-board computer might be nice also.

THE AIRPLANE. Model Merchant's "Revenger" kit is an updated version of a design by Dick Russ that was published in *RCM* in May, 1978. The kit is available in three versions: a "builder's kit," which is a conventional balsa-foam kit; a "pre-fab" kit, in which all components are assembled and sheeted; and a "completed" kit, with painted fuselage and MonoKoted flying surfaces. The kit reviewed in this article is the pre-fab version, the most popular.

Workmanship on the pre-fab kit is impeccable. Rather than describing completion of the kit (which would be meaningless in this case since 80% of it is already done), I will attempt to convey just how prefabricated this kit really is.

The wing and stab come completely sheeted with balsa and already sanded. Tip blocks are installed and rounded, and the dihedral angle in the wing is cut. The